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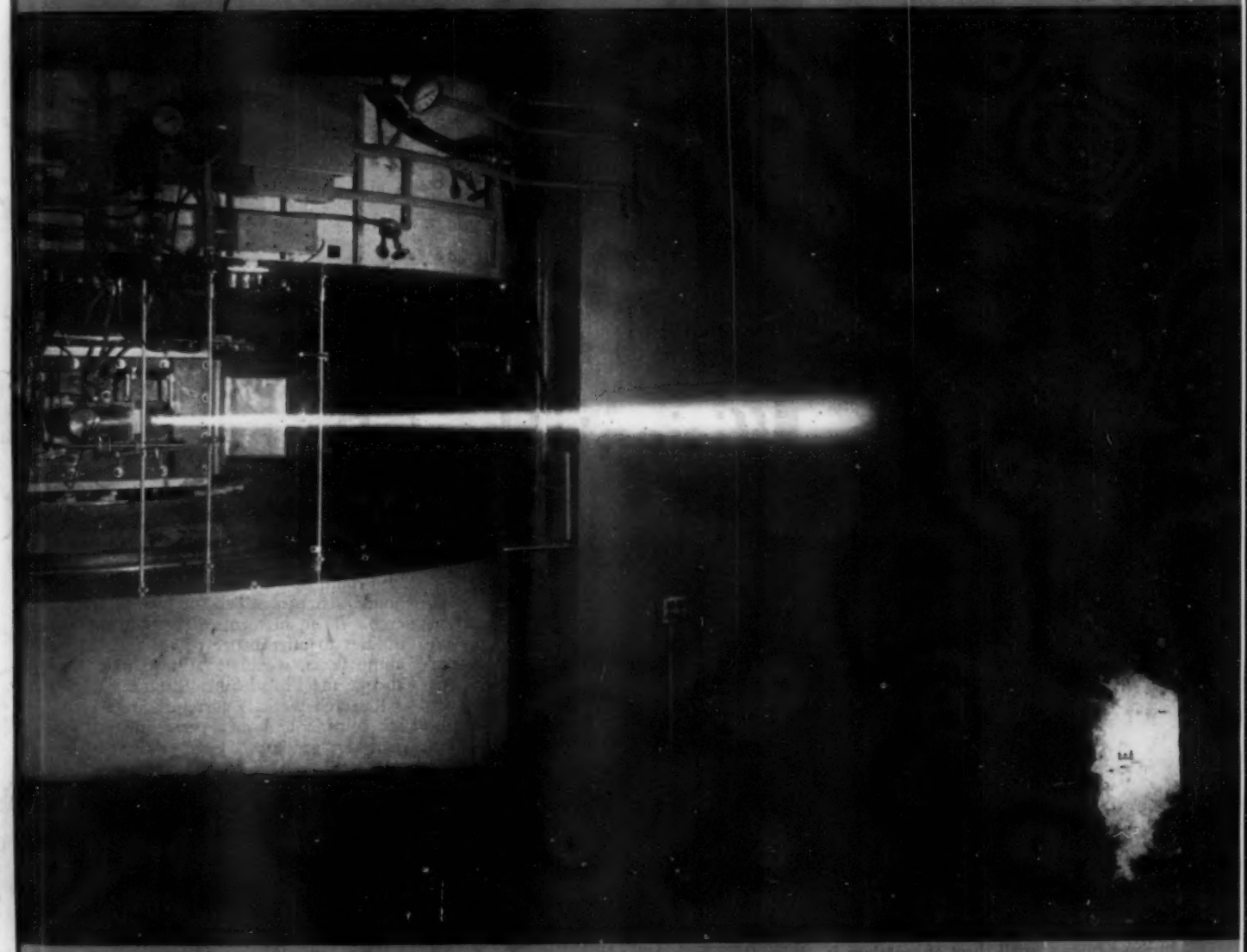
THE WEEKLY SUMMARY OF CURRENT SCIENCE



Potent Beam

See Page 264

A SCIENCE SERVICE PUBLICATION

ANIMAL HUSBANDRY

Calf Experiments Show Scanty Diet Possible

➤ CATTLEMEN COULD save several hundreds of millions of dollars this year if they would feed their calves minerals, proteins and vitamin A to bring the range diet to the minimum for good health and no loss of weight.

This is pointed up by experiments with sets of identical twin calves conducted at the Bureau of Animal Industry, Beltsville, Md. Beef calves forced to live on scanty rations for as long as six months can still produce high quality meat, U. S. Department of Agriculture scientists have discovered.

They catch up in poundage later, and the meat is at least equal in quality to that from animals that have been continuously well fed.

The great savings possible with supplementary feeding are particularly important this year, when the winter rations will be very low because of the drought.

One set of identical twin calves can give as accurate data for feeding experiments as 40 cows that are merely of the same breed and general type, Dr. Clarence F. Winchester, who conducted the feeding tests, told SCIENCE SERVICE.

In the tests, one twin of each of ten pairs was kept on rations that were slightly below the maintenance level, while the other twin was given full feed. Rations for both sets of twins included the basic level of proteins, minerals and carotene.

When the scantily fed calves were later put on full feed, they gained rapidly and economically, thus the recommendation to cattlemen to feed the necessary supplements to their cattle.

Science News Letter, October 25, 1952

SURGERY

Noses Get "New Look" With Tantalum Mesh

➤ A "NEW LOOK" for veterans with smashed noses due to wartime injuries is being developed by Dr. Joel Pressman of the University of California at Los Angeles School of Medicine.

Dr. Pressman uses tantalum mesh, a fine metallic screen, which can be molded and implanted within the nose to take the place of macerated nasal bone. In time fibrous tissue grows into the mesh, firmly fixing the metal implant as if it were intended to grow there, Dr. Pressman says.

In some cases a small sheet of tantalum is used rather than the mesh. The fibrous tissue tends to form a firm basis for the shape of the nose so that the metal sheet may later be removed.

The nasal passage is exceptionally tolerant of the metal, so that there are seldom complications arising from the implant, according to the findings of the U. C. L. A. surgeon.

Science News Letter, October 25, 1952

NEW WEAPON—This new gun for atomic missiles is being assembled at the Dravo Corporation's Pittsburgh plant. The cradle for the barrel is here being assembled to the carriage.

ENGINEERING

Efficient Heat Pumps

➤ FINDING A way to make heat pumps so efficient that they can compete favorably with other household heating systems is the bull's eye of a target now being shot at by power companies.

Discussion at the American Institute of Electrical Engineers' fall meeting in New Orleans indicated that heat pumps may go into more future houses if some way can be found to reduce their electric power consumption, to smooth over their demand for heavy amounts of power on cold days, and to store heat for several days.

Heat pumps work something like ordinary refrigerators. They pump heat out of wells, air or the ground, and release it in houses. In the summer the cycle can be reversed so that the houses are cooled.

Before heat pumps can compete favorably with coal-, gas- and oil-fired heating plants, their power requirements must be reduced, reported Philip Sporn, president of the American Gas and Electric Service Corp., and E. R. Ambrose, also of that company. An improved, more efficient mechanical design should help cut the power bill.

A large heat pump would have to work long hours to keep the house at the proper temperature on cold days, said J. H. Harlow and G. E. Klapper of the Philadelphia Electric Co. That would create a big load problem to power companies.

Heat storage tanks might help solve that problem. The tanks would receive "surplus" heat on warmer days and would act as a heat reservoir on cold days.

The heat pump of such a system therefore could be a smaller unit running longer hours. Its power demand would be more even. That, in turn, might induce electric utilities to offer better power rates to heat pump users, speculated Constantine Barry, also of the Philadelphia Electric Co.

Research workers currently are searching for suitable and inexpensive materials for heat storage tanks. Glauber's salts, for instance, have been found to show some of the desired qualities.

Reporting on residential heat pump experiments in Philadelphia, A. H. Kidder and J. H. Neher, both of the Philadelphia Electric Co., pointed out that earth makes a good heat source. It also acts as a practical "sink" into which heat can be pumped from the house in the summer.

They also said that heat withdrawn from the ground during the winter is completely restored by the next winter. Thus, there is no need to worry about the earth's heat "playing out" in a few years, leaving the house chilly during a cold snap.

Science News Letter, October 25, 1952

Prairie dogs live in a "dog society" highly organized with respect to economic needs, social behavior and population control.

MEDICINE

Polio Protection Pill

Vaccine is not available for human use yet, but success is reported in getting one strain of poliomyelitis virus to grow in chick embryo where it loses virulence.

➤ A PILL to protect children against polio is on its way, it appears from results announced by Dr. Herald R. Cox of Lederle Laboratories, Pearl River, N. Y., at the opening ceremonies of the biochemistry and virus laboratory building of the University of California, Berkeley.

The pill will contain living polio virus "tamed" by growing through many generations, first in the bodies of suckling hamsters and then in hen's eggs.

Success in getting the MEFI strain, Lansing type of poliomyelitis virus to grow in the developing chick embryo was achieved by two groups of scientists at Lederle, Dr. Cox announced.

Monkeys and chimpanzees given this virus failed to show symptoms of polio, but developed protective antibodies against the virus that had been in the hamsters and against Lansing type strains of virus from two other institutions.

This accomplishment, Dr. Cox pointed out, does not mean that a vaccine against polio will be available at once. He stressed that no prediction can be made as to whether or when such a vaccine might become a reality.

If and when made, it will probably be given in pills or some other form that can be swallowed. This appears from his statement that, in his opinion, this would be the logical way to vaccinate babies and children against polio. The reason is that the pill method would be following the natural one in which polio infection comes through the digestive route.

The safety of this method was shown by another Lederle team headed by Dr. Hilary Koprowski. They fed a living polio virus, Lansing type, of low virulence to 20 human volunteers. None of the 20 got sick or had any temperature rise, though all were watched very carefully. All that were not immune to polio virus at the start of the trial developed antibodies to the Lansing virus, though not to other types of polio virus.

Antibodies are the substances developed in the blood that protect against polio virus. Many children and grown-ups have these protective antibodies, even though they have never gotten enough polio virus to be sick. The antibodies in the blood of most grown-ups are the source of the gamma globulin tried this summer for protection of children against the disease. This kind of protection, however, is not lasting and in Dr. Cox' opinion is only a stop-gap procedure.

The scientists who have, for the first time, succeeded in getting poliomyelitis virus to grow on chick embryos are Drs. Arden W. Moyer, Manuel Roca-Garcia and Victor J. Cabasso.

This achievement is considered important because it gives a way of growing the virus free of any possible contamination by other viruses or bacteria, and because it makes possible growth of the "tamed" virus on a large scale, which would be needed for vaccine production. Heretofore, the sources of polio virus have been either the brains and spinal cords of man, monkeys, chimpanzees and certain rats, or, more recently, cultures of human and monkey tissues.

The virus successfully fed to 20 human volunteers by Dr. Koprowski and associates was prepared from the brain and spinal cord of cotton rats. Studies of the mouth route for polio vaccination are being continued, Dr. Cox said, in conjunction with the California State Departments of Public Health and Mental Hygiene and the Hooper Foundation of the University of California.

Science News Letter, October 25, 1952

ATOMIC CANNON—This is the U. S. Army's newest weapon, the 280-mm. gun which is capable of firing either conventional or atomic shells. Here it is firing a conventional shell in a demonstration at Aberdeen Proving Ground. The gunner at the left, standing about 75 feet from the gun and with his back turned for protection from the blast, has just fired the gun by twisting the handle on the firing key.

TECHNOLOGY

Atom Cannon Has Double Recoil Mechanism

➤ THE REMARKABLE thing about the Army's atom cannon is the double recoil mechanism that is an essentially new application in artillery.

This weapon that fires a 280 millimeter (over 11 inches) diameter shell sits down upon the bare ground whereas lesser weapons have had to be bedded in dug pits. It neutralizes the energy of the firing first by movement of the gun itself. Then there is a sliding of the carriage itself that absorbs more of the energy. The whole mechanism slides back into firing position again.

The ease with which the new gun operates, the few minutes it takes to set it up for firing and the way it travels over rough grounds are results of years of planning and design.

A famous science institution in Philadelphia, the Franklin Institute, is not generally known as an incubator for weapons of war, yet out of the brains and laborious design computations of a small group of civilians there has come the new gun that can, if need be, hurl atomic bombs about 20 miles.

This group includes F. S. Chaplin, as associate director, A. O. Bergholm and A. O. Olander as engineers, Dr. Rupen Eksergian as consultant, Dr. N. H. Smith as director of the Franklin Institute Laboratories and George S. Hoell, recently retired as associate director. They did the intricate stress analysis and engineering which Army ord-

nance and industrial concerns have transmuted into metal. Whether or not guided missiles take up the task in future of delivering atomic bombs for ground troop support in any weather, the 280 mm gun is in production and is the newest and latest artillery weapon the world has seen.

Science News Letter, October 25, 1952

AERONAUTICS

Hail as Flying Hazard

➤ HAIL AS a hazard in flying has become a matter of alarm to airline companies now that routine operational flights are made during bad weather. Even brief encounters with hard hail can cause major structural damage to a plane.

The leading edges of the wing and the tail are the most susceptible to damage by hailstones, according to a report of the National Advisory Committee for Aeronautics. Damage to the fuselage is usually confined to the nose and cockpit sections.

Windshields and canopies are sometimes broken or cracked. Engine cowlings are damaged to about the same extent as leading wing edges. Ignition harness and cooling fins are sometimes injured enough to require replacement. Engine air-intakes may be blocked by the hail.

Hail is usually encountered by airplanes in thunderstorms. The best way to avoid it is to keep out of thunderstorm areas. This is not always possible, however; hail may be encountered outside but near a thunderstorm. Where such cases are reported, it is presumed the hail was blown out of the thundercloud.

Many military and some commercial planes are now equipped with radar which can be used to detect areas of precipitation. This equipment, however, gives no indication of the type or intensity of precipitation. It gives no warning of hail within the precipitation area. But it does give warning that permits a pilot to change his route and circle the storm center.

Military and civilian air-transport operators are now interested in air-borne radar which will enable a pilot to avoid the dangerous areas within thunderstorms and squall lines, and to fly through precipitation clouds with safety and comfort.

The report was prepared by Robert K. Souter and Joseph B. Emerson of the NACA laboratory at Langley Field, Va. It includes a summary of damages to planes by hail as reported by the U. S. Air Force, civil airline companies and the Civil Aeronautics Administration. The report, "Summary of Available Hail Literature and the Effect of Hail on Aircraft in Flight," summarizes experimental work by the CAA in bombarding stationary planes with pellets of ice the size of hailstones.

Science News Letter, October 25, 1952

VETERINARY MEDICINE

Medical Whodunnit Solved

➤ SOLUTION TO a medical whodunnit story, the mystery of the seven sick race horses, has just been reported to the Army Medical Service Graduate School in Washington. The solution brought the discovery that Japanese encephalitis, a brain inflammation, exists in Malaya, where it had never before been even suspected.

Unfortunately, an English nurse also got sick and died before the mystery was solved.

Scene of the mystery was Malaya. The horses got sick in the summer of last year, dismaying their backers by suddenly going off their feed, developing circling gaits, fever and weakness of various degrees. British government veterinarians in Singapore were even more dismayed, because the symptoms suggested the brain disease, encephalitis, sometimes called sleeping sickness, which attacks both horses and humans.

While the veterinarians and U. S. Army medical researchers in Kuala Lumpur puzzled over the mystery of the sick horses, an English nurse in the British Military Hospital in Kinrara developed some of the same symptoms. In spite of all efforts to save her, she died within a few days. Tests that had been made on her, however, enabled the scientists to discover the killer, the virus of the disease, of Japanese encephalitis.

The same virus had attacked the horses.

The reason that the presence of the virus in Malaya had not been discovered before is explained as follows: If a virus goes about its work quietly and steadily, without causing epidemics, it can easily go undetected among human and animal populations exposed to it from birth. In such endemic areas, it usually is not until foreigners arrive, adults with no immunity, that the virus gets into the limelight by suddenly causing one or more cases of serious sickness.

The medical and veterinary detectives who solved the mystery were: Capt. Philip Paterson, Maj. Herbert Ley, Jr., Maj. Charles Wisseman, Jr., Dr. William Pond, Dr. Joseph Smadel and Lt. Fred Diercks of the Army Medical Service Graduate School, Washington, D. C.; Dr. H. D. G. Hetherinton and Dr. P. H. A. Sneath of the British Military Hospital at Kinrara; Dr. D. H. Witherington of the Municipal Veterinary Department of Singapore, and Dr. W. E. Lancaster of the Federation of Malaya Veterinary Service. Medical report of the whodunnit will appear in the *American Journal of Hygiene* (Nov.).

Science News Letter, October 25, 1952

VETERINARY MEDICINE

Tipsy Cows Get Jag From Apples

➤ IF THERE are apple trees in the pasture, Bossy the cow may eat so many apples that she gets "tipsy." But she will not get over her apple jag without prompt treatment, the American Veterinary Medical Association warns. In Bossy's case, the symptoms are due to a type of poisoning which may end fatally. Malic or hydrocyanic acid in the apples are believed to have something to do with the poisoning.

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PHYSICS

New Transforming Device

An "electrical sandwich" of titanium dioxide used as rectifier is expected to relieve the demands on selenium which is now in short supply.

➤ THE SHORT-SUPPLY pinch of strategic selenium is forcing scientists to seek new materials that can be used in radio, television, and radar sets to convert alternating current to the direct current required to operate vacuum tubes.

Currently under development at the National Bureau of Standards is an "electrical sandwich" made of titanium dioxide that may help solve the selenium shortage. It permits current to flow easily in one direction, yet offers considerable resistance when the current tries to go the other way.

Such rectification now is being done by vacuum tubes and metallic "sandwiches" using copper oxide selenium, or magnesium-copper sulfide. Of these, the selenium rectifier is one of the most practical, commercially speaking.

Dr. R. G. Breckenridge and W. R. Hosler, the NBS scientists working on the titanium-dioxide rectifier, say their project seems to hold great promise. Although titanium is still rather high priced, more quantities of it are becoming available and its cost is dropping. Titanium-dioxide rectifiers soon should compare favorably in price to selenium rectifiers.

Military engineers who constantly are scouting for things that work at high temperatures have shown interest in the titanium-dioxide rectifier. It works well even at temperatures of 300 degrees Fahrenheit.

Generally speaking, half-inch squares of commercial titanium sheet metal only two-hundredths of an inch thick are used to make the rectifiers. The squares are heated in an atmosphere of steam at about 1,100 degrees Fahrenheit for about three hours while a semi-conducting layer of titanium oxide forms over the metal. Then silver is deposited on the squares, sandwiching in the oxide.

Wires are connected to each plate. When alternating current is impressed on the rectifier, the current moves much more freely in one direction than in the reverse.

Each "sandwich" can stand 20 volts across it. For a commercial unit, the titanium rectifier cells would be stacked together to form a sort of "Dagwood" sandwich until the battery of cells could handle the working voltage.

Although titanium-dioxide rectifiers still are in early developmental stages, Dr. Breckenridge said at least two companies are working on them in their own laboratories. The National Bureau of Standards will continue its research, he said, until "industry gets going on them" in the not-too-distant future.

Science News Letter, October 25, 1952

SETS RECORD—Col. Fred J. Ascani just received the USAF Mackay Trophy for setting a world speed record of 635.6 miles an hour in the 100-kilometer closed course competition at the National Air Races in Detroit.

GEOPHYSICS

Clue Found to Earth's Electrical Conductivity

➤ STUDYING THE optical properties of the mineral olivine under high pressure is giving a British scientist visiting at the University of California at Los Angeles some idea of what the electrical conductivity at the center of the earth is like.

This investigation, which is important in the study of the earth's magnetic fields, is being made by Dr. Keith Runcorn, assistant research director of Cambridge University's department of geodesy and geophysics, in U.C.L.A.'s Institute of Geophysics.

The rigid mantle of the earth is thought to consist largely of olivine, an insulator under normal conditions. At the high temperatures within the earth, its properties change enough for it to become a conductor. The electrical conductivity of the earth's mantle plays an important role in many geophysical phenomena, Dr. Runcorn points out.

For instance, it provides an electromagnetic coupling between the earth's mantle and liquid core. The activity of the coupling device may explain the small, irregular fluctuation occurring periodically in the earth's rate of rotation.

Science News Letter, October 25, 1952

TECHNOLOGY

Thin Seams Cut by Coal Mining Machine

➤ UNDER FAVORABLE conditions a new type of German coal planer machine can mine eight tons of soft coal in four minutes, and can feel its way along narrow seams that otherwise might be by-passed, the U. S. Bureau of Mines reports.

Tests conducted in a West Virginia coal mine revealed that the machine could chip out 83.3% of the coal contained in an 11-acre block. By conventional mining methods, only 78.1% of the coal would have been removed.

The high efficiency of the machine points to a "sharp increase" in the amount of fuel that can be mined from thin beds, and to increased reserves of high-grade coking coal. It also means that coal from seams as thin as 24 inches, previously left unmined, now can be recovered.

Traveling 75 feet a minute, the coal planer is dragged back and forth over a solid face of coal by an endless chain. Its steel teeth dig into the coal, which then is pushed on a conveyor.

Although the machine has proved to be satisfactory in mining Pocahontas No. 4 coal, further tests are needed to determine whether it will work well in beds of hard coal, Bureau engineers add.

Science News Letter, October 25, 1952

GENERAL SCIENCE

Relax McCarran Provisions

Attempt will be made when Congress reconvenes to remove some of the obstacles and difficulties preventing visits of foreign scientists.

➤ AN ATTEMPT will be made during the next session of Congress to relax some of the more stringent provisions of the nation's laws regulating visits to this country by foreigners.

Laying the groundwork for this attempt is the President's Commission on Immigration and Naturalization, which is expected to suggest changes in the McCarran Immigration and Nationality Act passed this year over the President's veto.

Scientists, particularly, are presenting a strong case to the commission for relaxation of present visa laws and regulations. They claim that the difficulties experienced by foreign scientists in getting permission to attend scientific meetings or to accept teaching positions in this country are actually hampering the nation's defense and interfering with its security.

The commission, headed by Philip B. Perlman, former Solicitor General, will not make its report until Jan. 1 at the earliest. Its recommendations are expected to be in line with the President's views, expressed in his veto message, that the McCarran Act is undemocratic.

Scientists are giving evidence before the commission at its hearings throughout the country. When the commission comes to Washington next week, the American Association for the Advancement of Science will offer testimony, urging relaxation of the present law and regulations. In addition, the National Science Foundation, a government body set up to protect the nation's interest in fundamental science, will be heard.

Illustrating the gravity with which scientists view the present restrictions, the *Bulletin of the Atomic Scientists* (Oct.) devoted an entire issue to the "American Visa Policy and Foreign Scientists." The situation is viewed as a "scandal" that is tearing down the reputation of the United States for democracy and fair play abroad.

Opinions from non-Communist newspapers in Europe liken the long and searching questionnaire to which applicants for visas are subjected to the kind of methods the Soviets use. This strengthens the hands of pro-Communists, the Bulletin states, and increases the ranks of those Europeans who are "neutralists" as between the U. S. and Russia.

It is estimated that almost 200 distinguished European scientists, who at one time or another have been invited by Americans to visit this country, have had visa trouble. In most cases, the trouble takes the form of delays which last until after the date on which the visit would be practicable. Case histories of 26 who were unable to visit this country because of trouble in securing their visas from American consulates are recounted.

The present law makes it necessary for the consuls to conduct exhaustive investigations into the past lives of persons wishing to visit this country. However, no additional personnel was authorized by Congress to conduct these investigations. This, plus the inadequate training of those who now conduct the investigations, is one cause for the delay.

Another cause, the Bulletin says, is the fear of American officials abroad of incurring the wrath of some of the more extreme members of Congress. They cannot get into trouble if they refuse a visa, it is pointed out, but they might if one were granted.

The President has had no success in persuading Congress of his opinion that present visa and immigration regulations are harmful to this nation's best interests. The commission's report will have to be acted on by both the next President and the new Congress. Whether its recommendations are accepted, of course, depends in large part on the outcome of the election.

Science News Letter, October 25, 1952

AERONAUTICS

Canadian Turbojets Now Used in Sabres

➤ CANADIAN-BUILT AMERICAN Sabres of the future will be powered by a Canadian-designed-and-built turbojet engine.

With this engine, it is claimed, the plane will be faster and more formidable than the all-American Sabre, and superior to the Russian MIG jet fighters now in use by the Communists in Korea.

Canadian authorities state the combination will link the world's fastest airframe with one of the world's most powerful engines. The Sabre, known as the F-86 and now in service in Korea, is a product of North American, Inc., and is the first American fighter plane to be built with swept-back wings. It made its initial flight in October, 1947, but since then several new versions have appeared.

A Sabre F-86A, complete with armament and normal combat equipment, established an official speed record of slightly less than 671 miles an hour. This plane was powered by a General Electric J-47 engine. Some models have been equipped with Allison engines and some with Pratt and Whitney turbojets. Some are equipped with afterburners.

Both Canada and Australia have been licensed by North American to produce Sabres for their air forces. The Canadian Sabre is built by Canadair, Limited, and its first product made its initial flight in 1950. The engine now to be used is a product of A. V. Roe Canada, Ltd., whose engineers designed it. The engine is known as the Avro Canada Orenda turbojet.

As a contribution to the military defense forces of the North Atlantic Treaty Organization, Canada is committed to send a 12-squadron air division to Europe. The first three of these squadrons equipped with Canadair-built Sabres are now based in the United Kingdom with three additional now ready to join them. Later squadrons will have Sabres with Orenda engines.

Science News Letter, October 25, 1952

GENERAL SCIENCE

Giving Atomic Data to NATO Is Lengthy Process

➤ THERE WILL be a long road to travel before the NATO nations can be given any information about atomic weapons, as recently suggested by Gen. Omar Bradley and Gen. J. Lawton Collins.

First the Defense Department, the State Department and the Atomic Energy Commission must agree as to just what kind of information will be made available to our allies. This is an extremely complex matter, not even suggested by the term used by Gen. Collins: "capabilities of atomic weapons."

Where the line is drawn between a description of a bomb's capabilities and how it is made will be a hard thing to decide. Knowledge of the size of an atomic shell and of what damage it can do can lead to inferences as to how it is made and what goes into it.

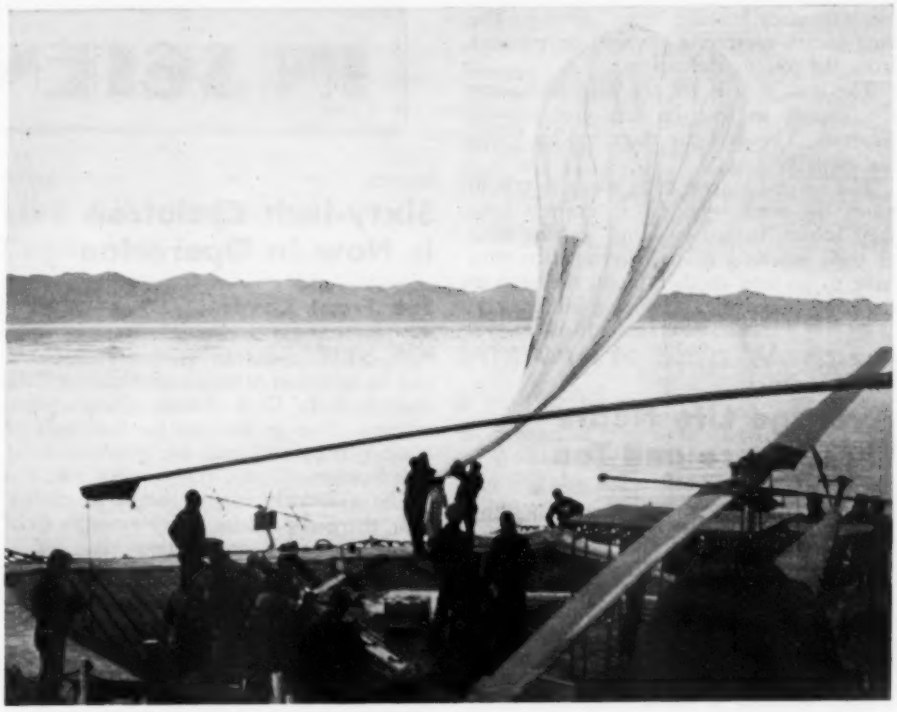
Staff work at the lower echelons in the three government offices involved has not even begun, it was learned. AEC officials have not yet been formally approached by the Defense Department, although some informal talking and thinking had gone on within both agencies even before the two generals spoke out.

Once it is decided just how the law should be changed, these suggestions must be presented to the Joint Congressional Committee on Atomic Energy. The consensus of opinion on Capitol Hill seems to be that, after much scrutiny to see that we are not "giving away too much," the Congress will accept the changes in the law. However, this cannot be until several months, at least, after Congress convenes in January.

One factor that will influence the decision is the recent British success in creating an atomic explosion. The British refused to share information with Americans about this explosion because their scientists and military leaders have been cut off from information about the American atomic program. Now there is more of a tendency to share information on a *quid pro quo* basis.

Science News Letter, October 25, 1952

Within 24 hours, the *temperature* has risen from 26 degrees to 126 degrees Fahrenheit in the Salah Oasis of the Sahara.



DAWN LAUNCHING—This cosmic ray balloon is being released from the deck of the Eastwind near Cape Parry off the Greenland coast. The purpose is to measure cosmic radiation in the vicinity of the northern geomagnetic pole.

PHYSICS

Cosmic Rays Captured

Balloon-borne rockets shot to altitudes of 40 miles above the top of the world brought back Geiger counter records and photographs of particles from outer space.

➤ A GROUP of scientists have just completed work on top of the world where they have been gathering information on cosmic rays amid the rumble of cracking ice and the menace of drifting icebergs.

Sponsored by the Office of Naval Research and the Atomic Energy Commission, the arctic project was aimed at revealing more about the nature and origin of the mysterious particles that continually bombard the earth from somewhere in space, and that some day may present a hazard to space-travelers.

The scientists launched 14 small-sized Navy "Skyhook" balloons from the deck of the U. S. Coast Guard Icebreaker Eastwind which crunched its way to within 442 nautical miles of the North Pole, the most northerly latitude ever reached by a ship under its own power.

Some of the Skyhook balloons carried Deacon rockets, slender missiles only about eight inches in diameter and 10 feet long. Originally designed for gathering information on the weather, the rockets were lifted high into the air and then fired. Under their own power the rockets roared to altitudes of about 40 miles.

Sensitive instruments in the rocket noses radioed information back to the Coast Guard cutter as primary cosmic particles collided with Geiger counters or ionization chambers cached in the rocket war-head.

Primary cosmic rays are the original nuclear particles from space. Most of them collide with elements of the atmosphere, shattering the atoms and producing secondary cosmic rays. The secondary rays are the ones most frequently detected on the earth.

Other Skyhook balloons carried photographic plates which recorded tell-tale tracks of the cosmic rays at different altitudes. The balloon-borne photographic plates reached altitudes of about 17 miles.

One such set parachuted to Ellesmere Island and another to the Greenland icecap within 10 miles of the geomagnetic north pole. But blustry August blizzards prevented Navy helicopters from recovering the equipment. However, the scientists hope Greenlanders and Eskimos will find the instruments and return them for the $100 reward.

Baffin Bay, bordering Canada's northeast coast, was selected as the site because of its nearness to the geomagnetic pole. Weak primary cosmic rays that otherwise would be deflected by the earth's magnetic field could be studied there. Gathering data on the weak rays rounds out a Navy program of basic research aimed at revealing more about the origin and nature of the mysterious rays.

Helping the Navy and the AEC in the arctic project were General Mills, which made the Skyhook balloons out of a polyethylene plastic film only one one-thousandth of an inch thick; New York University, and the State University of Iowa.

Scientists must analyze the collected information for about two or three months before any findings can be revealed, the Navy reported.

Science News Letter, October 25, 1952

VITAL STATISTICS

Death Rate Low for Fourth Consecutive Year

➤ THE DEATH rate in the United States has been less than 10 per 1,000 for the fourth consecutive year, statistics compiled by the U. S. Public Health Service show.

The figures, latest available, show an estimated death rate of 9.5 per 1,000 for 1951, which is practically the same as the 1950 final figure.

Nevertheless, heart and circulatory diseases claimed 17,300 more lives in 1951, cancer 8,500 more and accidents 4,800 more than in 1950.

Death rates for tuberculosis, syphilis, poliomyelitis, chronic nephritis and other causes decreased in 1951. The tuberculosis death rate hit a record low of 19.2 per 100,000 population.

Science News Letter, October 25, 1952

INVENTION

Cyclotron Inventor Gets Color TV Patent

➤ DR. ERNEST O. LAWRENCE, Nobelist inventor of the cyclotron, and Lin Yutang, Chinese philosopher, both received patents from the government in Washington.

Dr. Lawrence, head of the radiation laboratory at the University of California, Berkeley, received a patent for a color television tube which has been hailed as a simple method of receiving color television broadcasts. The patent is numbered 2,614,231 and is assigned to Chromatic Television Laboratories, Inc., San Francisco.

Lin Yutang, who has written several books in English, received patents on a typewriter that will type Chinese characters, and a visual selecting device for Chinese typewriters. Numbered 2,613,795 and 2,613,794, respectively, they were assigned to the Mergenthaler Linotype Company, Brooklyn.

Science News Letter, October 25, 1952

PHYSICS

Tiny Crystal Stores 2,500 Information Bits

➤ A TINY crystal with a whopping big memory shows "considerable promise" as a means for storing information for computers and switching systems, delegates to the American Institute of Electrical Engineers meeting in New Orleans were told.

J. R. Anderson of the Bell Telephone Laboratories, N. J., reported that barium titanate seems to have the best memory-storage qualities of the different crystals tested.

In experiments, he said, as many as 2,500 bits of information have been stored in a square inch of the crystal's surface only a few thousandths of an inch thick. The information can be deposited there with electronic pulses less than a millionth of a second long, and will stay stored for a long time.

The crystals consume no power while storing information, and they offer the possibility of working from low-voltage circuits such as would be found in electronic computers and switchgear using transistors. Transistors themselves are tiny crystals that can do many jobs now being handled by vacuum tubes.

In addition to barium titanate, other crystals studied were rochelle salts, potassium niobate and potassium dihydrogen phosphate, he said.

Science News Letter, October 25, 1952

PSYCHOLOGY

Deaf Baby Taught to Talk By Same Method as Birds

➤ A DEAF child was taught to speak by the same method used in getting a parrot to say "Polly wants a cracker." Success in applying bird-training methods to the teaching of a baby is reported by Prof. O. H. Mowrer of the University of Illinois, Urbana.

The little two-year-old girl was so hard-of-hearing that the only time she heard her mother's voice was when she was naughty and the mother shouted "No, no!" at her. As a result, the child displayed no interest in hearing words and would not use a hearing aid.

The mother was then advised to stop scolding the child in a loud voice. Instead she tried shouting only endearments and pleasant words. Soon the child became interested in words and wanted to hear more of them. She was persuaded to wear a hearing aid so that she could listen better. Within six months she was using words herself.

This is roughly the method used in teaching a parrot to talk. The first step is to "tame" the bird, to care for it, play with it, feed it and provide it with attention until the bird becomes fond of its human friend. During this process, the human speaks or whistles to the bird until the sounds are linked in the bird's mind with pleasure—they become "good" sounds. The bird comes to receive comfort or pleasure from the sounds themselves.

The next step is for the bird to imitate the sounds so that he can give himself pleasure. This sets the stage for his learning to talk.

The normal human baby learns to talk in much the same way. Good mothers keep their babies "bathed in sound" during most of their working hours. Even when they have to go into another room, they call to the baby frequently, reassuring him.

Science News Letter, October 25, 1952

VITAL STATISTICS

Average Life Nears Three Score and Ten

➤ THE AVERAGE length of life for Americans is now close to the Biblical three score and 10 years, and getting closer every year. Barring a major catastrophe, it will reach that figure before 1960, statisticians of the Metropolitan Life Insurance Company in New York predict.

The industrial population has made greater progress in the past 40 years in reducing its mortality and increasing its longevity than the general population of the United States, the life insurance statisticians point out. In 1911-1912 expectation of life at birth among Metropolitan industrial policyholders was six and one-half years less than that for the population as a whole. Now the two groups are on a par.

A new high of 68.42 years life expectation at birth was reached in 1951 by the company's policyholders.

Science News Letter, October 25, 1952

ENGINEERING

Develop New Techniques For Sampling the Air

➤ NEW TECHNIQUES for sampling the air we breathe to evaluate its health hazards are being developed at the University of California at Los Angeles.

Albert Bush, assistant professor of engineering, is seeking the answer to such questions as "Do size, structure or number of certain particles in the air constitute a hazard?", and "Where do such hazards originate?"

Preliminary research has been concerned with developing techniques for evaluation of atmosphere in particular places. Samples of particles in the air have been collected by instruments designed for the study and examination of the samples under the electron microscope.

Los Angeles air has yielded a multitude of varied specimens for study. They range all the way from virus-like matter to star-shaped crystals.

One phase of the investigation revealed that Los Angeles municipal incinerators discharge 1,000,000,000,000,000 particles into the atmosphere per ton of refuse burned.

Science News Letter, October 25, 1952

IN SCIENCE

PHYSICS

Sixty-Inch Cyclotron Is Now in Operation

See Front Cover

➤ A NEW cyclotron is now completed and in operation at Argonne National Laboratory of the U. S. Atomic Energy Commission. It is to be used for the study of nuclear reactions and the production of radioisotopes.

The extremely intense beam of electrically charged particles which emerges from the instrument's acceleration chamber is shown on the front cover of this week's SCIENCE NEWS LETTER.

In operation, deuterium gas is fed into the acceleration chamber from which the air has been pumped. There the particles are given an electrical charge. Then they are attracted to one of the D-shaped parts of the accelerator. Reversal of the electric potential then drives them out of that Dee into the other one where another potential reversal drives them back. Successive reversals of current 22 million times a second speeds the particles round and round the instrument until they reach a speed of approximately 28,000 miles a second when they are permitted to emerge in the cyclotron's powerful beam.

Science News Letter, October 25, 1952

BIOCHEMISTRY

Cortisone Double-Edged Sword in Tuberculosis

➤ "IN TUBERCULOSIS, cortisone acts like a double-edged sword," Dr. Max B. Lurie of the University of Pennsylvania, Philadelphia, declared at the conference on cortisone and other adrenal gland harmones held at the New York Academy of Sciences.

The famous arthritis remedy suppresses inflammation. But while this tends to isolate the tuberculous infection from the rest of the body, it allows the germs to multiply locally, Dr. Lurie explained.

To make matters worse, the scavenger cells and other body defensive forces arrive too little and too late.

Increased adrenal gland function and cortisone stimulate the engulfing of germs by the body's scavenger cells, but the digestive capacity of the cells for the germs they have swallowed, as it were, is markedly reduced. This is true whether the germs are those of tuberculosis or pneumonia, streptococci or even red blood cells.

Moreover, Dr. Lurie pointed out, germs can accumulate in tissues without symptoms such as fever and toxemia which are suppressed by the hormone.

Science News Letter, October 25, 1952

NCE FIELDS

HERPETOLOGY

Live Albino Snake Captured in Illinois

➤ THE FIRST known albino snake of the plains garter snake type is being raised by Dr. David D. May of the University of Illinois. The snake's color varies from snowy white to pale yellow to pink. The normal black of the tongue is lacking.

Found within the city limits of Chicago's west side when newly-born, the albino has yellow stripes that are more brilliant than usual. The normal diamond pattern is outlined in pale yellow between the stripes, Dr. May reports, and the diamonds themselves are of a pinkish hue.

A normal snake of the same type of approximately the same age was found by Dr. May at about the same time as the albino. He hopes to raise both of them to maturity in order to try some breeding experiments with the albino, using the normal snake as the control.

Science News Letter, October 25, 1952

ELECTRONICS

Airway Patrols Check Electronic Flight Aids

➤ FEDERAL PATROLMEN are flying the 70,000 miles of national airways much as state officials in scout cars patrol American highways.

Unlike the highway patrolmen, however, they are little concerned with traffic on the airway routes but are much concerned with the ground-based electronic instruments that control traffic on the routes of airplane travel.

The planes used by airway patrols are equipped with special instruments to pick up all radio signals given out by radio-range stations as well as those needed for making instrument landings. They check the accuracy of such radio signals.

The sensitive checking instruments are installed and frequently checked at the aeronautical center maintained by the U. S. Civil Aeronautics Administration in Oklahoma City.

Every radio range on the airways must be identical in its operation and maintenance. Every instrument landing system must give the same signals for bad weather landings. Every one of the new omni-directional radio ranges that aid pilots in cross-country flights must be kept operating with courses true to within 2.5 degrees. To do this, the airway patrol, composed of veteran instrument pilots, fly the courses and make instrument landings to see that all instruments are working correctly.

Another job of the airway patrol planes is to locate electrical interference that sometimes affects radio airway aids. Such interference may come from a new barn, metal silo or bridge in the area near an omni-range. The remedy is usually much simpler than locating the culprit. CAA electronic engineers have not yet met a problem of this kind that they could not solve. About 85 patrol planes are used in this service.

Science News Letter, October 25, 1952

FORESTRY

Three Tropical Woods Immune to Ship Worms

➤ THREE TROPICAL woods immune to the ravages of ship worms have been found by William Ward of the Duke University Marine Laboratory, Beaufort, N. C.

Ship worms ruin dock pilings and small boats by boring into the wood. Although wood may be chemically treated to prevent such attacks, the process is expensive.

Of eight Cuban woods Mr. Ward tested for their resistance to ship worms by suspending in water, one was damaged heavily, four showed slight damage and three were not attacked at all. Their resistance, Mr. Ward says, may be due to wood resins that poison the worms.

The ship worm attacks by latching on to submerged wood with its tail, eating its way inward as it grows. The "undersea termites" reach a length of around seven inches in the Beaufort area, but they have been reported as long as four feet in some tropical waters.

Science News Letter, October 25, 1952

CHEMISTRY

High-Calory Food for Intravenous Feeding

➤ A STABLE glucose-alcohol solution which will supply more than 1,200 calories per liter when fed intravenously has been developed at the University of California at Los Angeles School of Medicine.

Solutions commonly used in intravenous feeding at the present time furnish only up to 400 calories per liter. This is not adequate to meet minimum energy requirements of patients, much less furnish extra calories needed in the healing processes. The new solution will do both.

Some solutions of high energy content have been developed previously, but all were unstable and could not be kept any length of time. The newly-developed solution can be stored indefinitely.

Developers of the new solution are Dr. John M. Beal, Dr. Frank Spencer and Dr. Jullian Smith of the surgical staff of U.C.L.A. and the Wadsworth Veterans Hospital.

Much of the investigation leading to the development of the solution was done at the Wadsworth Veterans Hospital. The research was supported by gifts from Don Baxter, Inc., and the U. S. Public Health Service.

Science News Letter, October 25, 1952

ARCHAEOLOGY

Ancient Civilizations Dated by "Slide Rule"

➤ FOR DETERMINING time sequences in archaeological collections, a new chronological "slide rule" has been devised by two University of California at Los Angeles anthropologists, Drs. George W. Brainerd and W. S. Robinson.

Use of the new technique will permit a greater degree of accuracy in determining the chronology of ancient civilizations. It may make possible determination of events in ancient history in terms of years rather than centuries.

The device combines all chronologically significant factors into a relatively simple mathematical formula. It is particularly applicable to large masses of material uncovered in random, unstratified samplings.

The device is based on a common archaeological method of determining time sequence known as "seriation." Seriation reflects gradual but constant changes in cultural manifestations such as pottery and clothing.

Science News Letter, October 25, 1952

VETERINARY MEDICINE

Longer Lives For Pet Dogs

➤ DOGS, LIKE their masters, can now look forward to longer, healthier lives than their ancestors had.

If the puppy survives the first year of life and is not run down by an automobile, he can expect to live to the age of 11 or 12 years, whereas a decade ago his life expectancy was only seven or eight years. There are no official statistics on dog longevity, but the figures given are estimates by experts of Lederle Laboratories who make medicines and vaccines for dogs as well as humans.

Distemper once killed more dogs than many other diseases combined, but now there is a highly effective vaccine against it. A new vaccine against rabies has also been developed, and is said to give solid, lasting immunity to this dreaded disease. The new vaccine is a modified live virus vaccine that does not cause post-vaccinal paralysis, a reaction often as terrible as the disease.

The so-called wonder drugs of human medicine, such as sulfa drugs, penicillin, aureomycin and others, are helping in treatment of germ diseases that attack dogs. A drug developed to fight filariasis, a serious tropical disease that affects millions of humans, is used to fight heartworms and large roundworms in dogs.

There are about 2,500 animal hospitals today, each equipped to take care of 10 or more animals. At these hospitals, a sick dog may get a thorough examination including X-rays, blood test, heart test, diet test and almost every test his master might get if he were sick.

Science News Letter, October 25, 1952

ASTRONOMY

Venus and Jupiter Visible

You can see lovely Venus from one and a half to two and a half hours after sunset after twilight has ended. Jupiter, not nearly so bright, still is brighter than stars.

By JAMES STOKLEY

➤ THE TWO brightest planets, Venus and Jupiter, are now both visible in the evening sky.

Venus, the more brilliant, has been there since late summer, but so low as the sun went down that it was only seen during the twilight period. It set before the sky was really dark. With the coming of November, Venus remains in the sky for more than an hour and a half after sunset, well after twilight has ended.

By the end of the month, Venus will set some two and a half hours after the sun, and will be a conspicuous object in the southwestern sky in the early evening.

Jupiter, about a third the brilliance of Venus but far brighter than any other star or planet, has come into the evening sky from the later hours. During the summer, it rose around midnight, but each month its rising has been earlier.

On Nov. 8, it is at opposition—directly opposite the sun—so then it rises in the east as the sun sets in the west, and sets at sunrise, thereby remaining visible the entire night.

In the early evening of November, it will be possible to see Venus in the southwest, in the constellation of Sagittarius, the archer; and Jupiter in the southeast, in Aries, the ram.

The accompanying maps show the appearance of the sky at about ten p.m., standard time, on the first of November; an hour earlier on the 15th, and two hours earlier on the 30th. These times are a little too late for Venus, so that planet is not shown, though Jupiter is indicated, high in the southeast.

Mars Much Fainter

The planet Mars is also visible these evenings, but much fainter than Venus or Jupiter, for it is about as bright as a typical first-magnitude star. It is in the southwest, a little to the east of Venus, in the constellation of Sagittarius, at the beginning of November.

Mars' eastward motion, however, takes it next-door into Capricornus, the sea-goat. Thus, for its position at the end of November, it just gets on our map of the southern sky.

Mercury, too, is in the evening sky around Nov. 9, but sets less than an hour after sunset, and will hardly be visible. Saturn is seen much later in the night, to the southeast in Virgo, the virgin. On Nov. 1, it rises about an hour and a half before sunrise, and about three and a half hours before the sun at the end of the month.

Brightest star of the November evening is Vega, in Lyra, the lyre, toward the northwest. Immediately above this group is Cygnus, the swan, part of which forms the northern cross, standing almost upright, with the bright star Deneb at the top.

To the left of Lyra is Aquila, the eagle, of which the star Altair is part. Low in the south, we can see Fomalhaut, about the only star of Piscis Austrinus, the southern fish, that is easily visible in these latitudes.

Look for Orion's Belt

Toward the east, as shown on the maps, there now appears a group of bright stars which make the evening skies of winter so brilliant. Look first for the three fainter stars, in a vertical row, that form the belt of Orion, the warrior. To the right is Rigel, and to the left is Betelgeuse, both of the same constellation.

Above Orion is Taurus, the Bull, with the red star Aldebaran. To the left of Taurus we find Auriga, the charioteer, in which Capella stands.

Now that Venus and Jupiter have made their appearance in the evening sky—the one in the west and the other in the east—it will be interesting to watch their movements during the coming months. Venus will continue to draw to the east of the sun, and to set later and later after sunset, until the end of January, when it will start to approach the sun again.

Even then, however, it will continue to brighten, reaching greatest brilliancy on March 8. After that, it will quickly disappear from the evening sky, passing the sun on April 13, and soon thereafter will reappear as a morning star in the east before sunrise. On May 19, its brilliance will again be at its maximum.

Jupiter, at present, is moving in a westerly direction through the sky, which you can observe if you compare its position from time to time with nearby stars, so it is approaching Venus, moving in an easterly direction.

On Jan. 5, Jupiter will halt its westward motion, turn around and then move eastward. By the first of February, it will be high in the south at sunset.

The sun's own movement in the sky will bring it nearer and nearer to Jupiter. That planet will set earlier and earlier, until on May 25 it will go down with the sun. By early summer, it too will be a morning star, and on July 22 Venus will pass it.

By December, 1953, Jupiter will again be opposite the sun, and, as now, will once more be visible through the night.

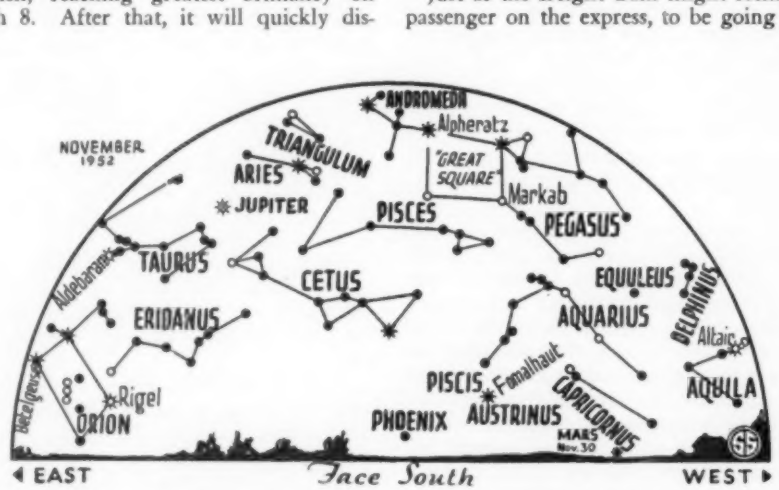
Such movements are rather puzzling unless one appreciates the fact that these planets, as well as our own earth from which we observe them, are all moving around the sun, and at different speeds.

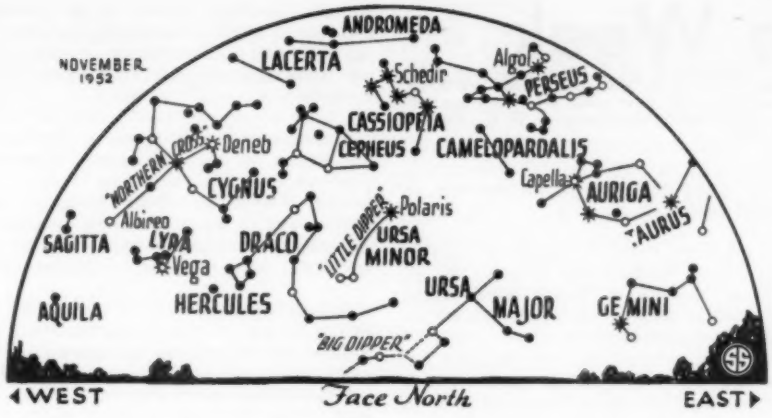
In ancient times even the astronomers, with a few notable exceptions, did not know this, and they had to invent a complicated mechanism, because they thought the earth was fixed and that all the planets, as well as the sun, revolved around us.

Earth Travels Faster

The average speed of the earth in its orbit is 18.5 miles per second, while that of Jupiter is only 8 miles per second. Now that we are both in the same direction from the sun, we are overtaking that giant planet, much as an express train might pass a slow freight on the next track.

Just as the freight train might seem, to a passenger on the express, to be going back-





wards, so does Jupiter seem to be in reverse, or retrograde, motion to passengers on the earth. By next January, we will be far enough ahead, and around the curve of our orbit, so that we will see Jupiter moving to the east, as it really is doing all the time.

Venus, on the other hand, is closer to the sun than we are and travels around at an orbital speed of 22 miles a second. Last June, Venus was behind the sun, but then it swung to the east of that great orb, and began to be visible in the west after sunset, catching up to the earth by virtue of its greater speed.

Next Jan. 31, Venus will be farthest east of the sun, setting latest, after which the two bodies will start drawing together again, and on April 13 will come between the sun and the earth. It will then be overtaking us at a speed of about 4 miles per second. To an observer on Venus, the earth would then seem to be going backwards in the sky, just as Jupiter is now doing for us.

Changes Phase

Since Venus is sometimes nearer to us than the sun is, its sunlit half is then largely turned away from us. At such times, viewed through a telescope, Venus appears like the crescent moon. At other times, when Venus is farther than the sun, it is more like the full moon, for we can see most if not all of its bright hemisphere.

When Galileo, in Italy about 340 years ago, discovered that Venus went through a complete change of phase, just as the moon did, he provided very conclusive proof of the ideas of Copernicus—that the earth revolved around the sun.

Under the older theory, Venus could never be beyond the sun; hence, could never show a full phase, but would always be more or less of a crescent.

Celestial Timetable for November

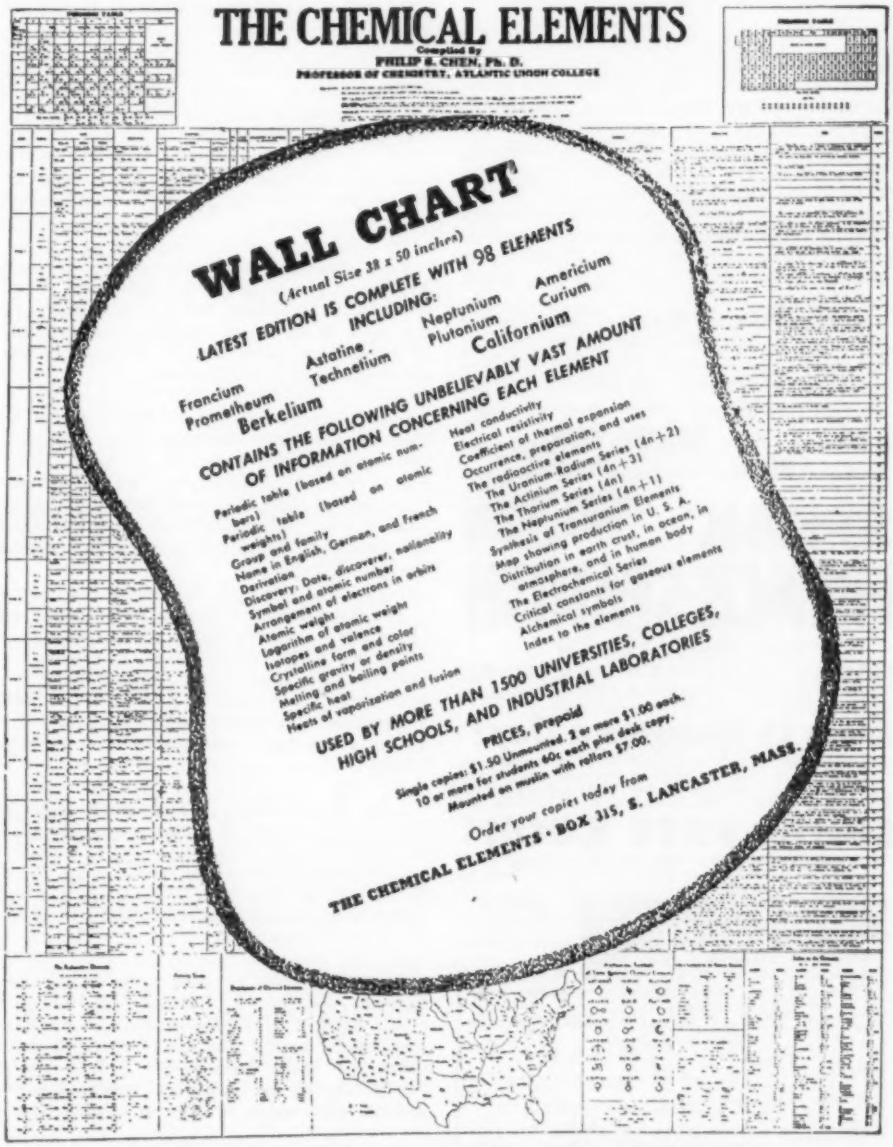
Nov.	EST	
1	6:10 p.m.	Full moon.
2	9:54 a.m.	Moon passes Jupiter.
8	4:00 a.m.	Jupiter opposite sun and nearest earth, distance 371,000,000 miles.
9	10:43 a.m.	Moon in last quarter.
	10:00 p.m.	Mercury farthest east of sun.
10	1:00 a.m.	Moon farthest, distance 251,200 miles.
		Meteor shower radiating from constellation of Leo.
17	7:56 a.m.	New moon.
18	10:15 p.m.	Algol at minimum.
20	6:11 a.m.	Moon passes Venus.
21	7:04 p.m.	Algol at minimum.
22	12:28 a.m.	Moon passes Mars.
23	3:00 a.m.	Moon nearest, distance 230,000 miles.
24	6:34 a.m.	Moon at first quarter.
29	12:28 p.m.	Moon passes Jupiter.
30	6:00 a.m.	Mercury between earth and sun.

Subtract one hour for CST, two hours for MST, and three for PST.

Science News Letter, October 25, 1952

The *blue goose* migrates south to the Gulf of Mexico in the fall; each spring it flies northward to Baffin Island just above the Arctic Circle.

Very few forest-soil *nutrients* are removed when timber is harvested; most of them are stored in tree leaves which are left in the forest.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Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. books in print, send a remittance to cover retail price (postage will be paid in U. S.) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

AERONAUTICS AT THE MID-CENTURY—Jerome C. Hunsaker—*Yale University Press*, 116 p., illus., $3.00. Aeronautics, the author points out, offers new means to make war at a distance, but by this very threat, it stimulates interest in peaceful settlement of differences.

THE AMERINDIAN: American Indian Review, Vol. 1, No. 1—Marion E. Gridley—*Gridley*, 4 p., illus., paper, $2.50 per year. A new publication devoted to news of the American Indians and material advocating Indian interests.

ANNUAL REPORT OF THE BOARD OF REGENTS OF THE SMITHSONIAN INSTITUTION 1951—A. Wetmore, Secretary—*Govt. Printing Office*, 449 p., illus., $3.00. The General Appendix contains a selection of research reports on a wide variety of subjects from stormy weather on the sun to the history of artificial lighting in the United States and the development of the half-tone screen.

ARE THESE OUR DOCTORS?—Evelyn Barkins—*Fell*, 192 p., $2.50. Telling how your medical adviser appears in the intimacy of his home.

CHAMPION CAMPAIGNER FRANKLIN D. ROOSEVELT—Harold F. Gosnell—*Macmillan*, 235 p., illus., $3.50. The author believes that the affection and serenity with which Roosevelt was surrounded in early childhood contributed to his great confidence and liking for people that were the secret of his charm as a campaigner.

CONTRIBUTIONS OF BROWNING RESEARCH TO RATION ITEM STABILITY—Jack H. Mitchell, Jr. and Martin S. Peterson, Eds.—*Research and Development Associates*, 56 p., paper, $1.00. Papers reporting research on deterioration of dehydrated foods.

DICTIONARY OF CIVIL DEFENCE — Carlton Wallace, Ed. — *Philosophical Library*, 160 p., illus., $2.75. A book of British origin telling first-aid workers what to do about various injuries, arranged alphabetically.

ECONOMIC USE OF FORAGES IN LIVESTOCK PRODUCTION ON CORN BELT FARMS—Russell O. Olson and Earl O. Heady—*Govt. Printing Office*, USDA Circular No. 905, 44 p., paper, 10 cents. Forage crops also retard erosion and improve the soil.

A FIELD GUIDE TO SHELLS OF THE PACIFIC COAST AND HAWAII—Percy A. Morris—*Houghton Mifflin*, 220 p., illus., $3.75. Beautiful illustrations, many in color, and clear, non-technical descriptions will aid the amateur to identify his finds.

GALILEO: First Observer of Marvelous Things—Elma Ehrlich Levinger—*Messner*, 180 p., $2.75. A biography of the great scientist written with imagination.

GLANDS, SEX, AND PERSONALITY—Herman H. Rubin—*Funk*, 205 p., $2.95. A non-technical book about glands.

THE HISTORY OF ASTRONOMY—Georgio Abetti, translated from the Italian by Betty Burr Abetti—*Schuman*, 338 p., illus., $6.00. In this work by an Italian astronomer, the emphasis is, understandably, on the personalities and achievements of his countrymen.

HOW CHILDREN LEARN TO READ—Helen K. Mackintosh—*Govt. Printing Office*, Office of Education, Bulletin 1952, No. 7, 16 p., illus., paper, 15 cents. Telling about the whole complex process from the time when the baby takes a book and makes believe he is reading like Daddy to the time when he uses his own library card.

THE IMMACULATE FOREST: An Account of an Expedition to Unexplored Territories Between the Andes and the Amazon—W. R. Philipson—*Philosophical Library*, 223 p., illus., $4.50. A fascinating account of the experiences that awaited some naturalists when they explored a part of the jungle where men had never been before.

LIPID METABOLISM: A Symposium Held at the London School of Hygiene and Tropical Medicine on 16 February 1952—R. T. Williams, Ed.—*Cambridge University Press*, 101 p., paper, $2.75. It has long been known that the pig produces fat from carbohydrate, but we still do not know exactly how.

MODERN TRENDS IN INFANT NUTRITION AND FEEDING—Jonathan T. Lanman with foreword by L. Emmett Holt—*Sugar Research Foundation*, 96 p., paper, free upon request to publisher, 52 Wall Street, New York 5, N. Y. Information on the nutritional needs of babies and the composition of common infant foods.

NEW RESOURCES BRING NEW OPPORTUNITIES: Seventh Quarterly Report to the President—Director of Defense Mobilization—*Govt. Printing Office*, 44 p., illus., paper, 30 cents. Reporting "substantial progress" in building America's strength.

PERSONALITY IN THE MAKING: The Fact-Finding Report of the Midcentury White House Conference on Children and Youth—Helen Leland Witmer and Ruth Kotinsky, Eds.—*Harper*, 454 p., $4.50. Stressing the importance of assuring the infant a feeling of trust in his world and, later, confidence in his own abilities.

PHYSIOLOGY OF THE EYE: Volume Two, Vision Arthur Linksz—*Grune & Stratton*, 869 p., illus., $19.00. In this book, preliminary work on which was done while the author was practicing ophthalmology in Budapest, Hungary, emphasis is on how the sense of vision conveys information to the mind.

POSTURAL DEVELOPMENT OF INFANT CHIMPANZEES: A Comparative and Normative Study Based on the Gesell Behavior Examination—Austin H. Riesen and Elaine F. Kinder—*Yale University Press*, 204 p., illus., $5.00. The development of baby chimpanzees as tested by the Gesell-Thompson baby tests is compared with that of human infants and monkeys. Comparable stages are reached by the chimp about one-third earlier than by babies. Implications concerning the theory of evolution are discussed.

PROCEEDINGS OF THE PAN-AFRICAN CONGRESS ON PREHISTORY, 1947—L. S. B. Leakey and Sonia Cole, Eds.—*Philosophical Library*, 239 p., illus., $8.75. Papers presented at a meeting which brought together specialists in prehistory, geology and paleontology.

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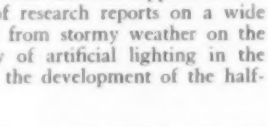

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RADIO SPECTRUM CONSERVATION: A Program of Conservation Based on Present Uses and Future Needs—Joint Technical Advisory Committee, IRE - RTMA — *McGraw-Hill*, 221 p., illus., $5.00. A group of engineers, who have developed this ideal allocation plan for space on the air, present it in non-technical language for non-professional readers.

SCIENCE NEWS 25 — A. W. Haslett, Ed.—*Penguin*, 128 p., illus., paper, 50 cents. Another of these interesting British collections of articles on various scientific subjects.

SEMIMICRO QUALITATIVE ANALYSIS—Paul Arthur and Otto M. Smith—*McGraw-Hill*, 3d ed., 285 p., $4.00. The first edition of this textbook was enlarged and revised to incorporate ideas received in response to questionnaires sent to teachers. It now contains much more theory.

WHAT WE CAN DO ABOUT THE DRUG MENACE—Albert Deutsch—*Public Affairs Committee*, 32 p., illus., paper, 25 cents. One method of attack on the narcotics problem is to clean up our slums; another is to tighten the controls on sleeping pills.

Science News Letter, October 25, 1952

TECHNOLOGY

Industrial Video Holds Great Future Promise

➤ THE UNBLINKING eye of television is being used in industry to cut costs, to reduce accidents and to lower capital investment. Under certain conditions, it also provides more information than can be gained by direct observation.

Speaking to the American Institute of Engineers meeting in New Orleans, G. Holmes Wilson of the Diamond Power Specialty Corp., said the Utiliscope, the heart of industry's video system, now is used in 200 industrial applications. New jobs are being found for it so fast that it seems to have an even greater potential than commercial television, he said.

The Utiliscope is less sensitive and less complicated than commercial television apparatus. Known as a "long-life, cold cathode tube," it needs no filament or electron gun.

Although industrial television still is in its infancy, Mr. Wilson predicted that it soon would be used by guards to watch remotely located plant gates, to identify employees, and perhaps even to regulate vehicular traffic.

L. M. Exley, a Long Island, N. Y., Light Co. engineer, reported that his company is using television to watch the furnace in its Port Jefferson steam plant. Placed in an opening at the top of two pulverized-coal and oil-fired furnaces, the camera shows furnace changes that occur during different stages of fuel combustion. The camera lenses are protected by water- and air-cooled glass.

In addition to yielding more information about furnaces in operation, the video system also has helped the company train men who have little opportunity to see what happens in a lighted furnace, he said.

Science News Letter, October 25, 1952

MEDICINE

You Can Catch Measles in 10 Seconds

➤ YOU OR one of your children could "catch" measles within 10 seconds, if conditions were right. The conditions would be such that a susceptible person was in close proximity to a measles patient during the stages of the disease when it is most contagious. These stages are just before and immediately after the rash appears.

The time it takes to be infected with measles is given in the *Journal of the American Medical Association* (Oct. 11) in answer to a question from a doctor. The doctor also asked whether there was any reason not to expose a healthy child to measles, if the child had been given gamma globulin.

This material from blood contains the anti-measles substances built up during an attack of the disease. Since most grown-ups in the United States have had measles, the blood now being collected through the National Blood Program has plenty of the anti-measles substances. Scientists have found a way of separating this from the rest of the blood and doctors are using it to protect children.

Gamma globulin modifies an attack of the disease, making it less severe and for this reason it is given to small children, or those who have just recovered from some other sickness and would be less able to stand an attack of measles.

Even so, the medical journal states, it is not advisable to expose a child to measles. Very rarely, serious complications develop with "mild measles."

Among complications of measles are the ear infection called otitis media, mastoid infection, pneumonia, bronchitis and occasionally encephalitis.

Science News Letter, October 25, 1952

TECHNOLOGY

Plastic Die Stamps Out Steel Truck Paneling

➤ SEVERAL HUNDRED steel cowl panels for Dodge trucks have been stamped out in Detroit by a plastic die attached to the powerful jaws of a standard 100-ton press, the Chrysler Corporation has announced.

Engineers adapted the plastic die principle to the automotive business after it had been successfully used in the aircraft industry to stamp out aluminum and stainless steel airplane parts.

Contrasted to the die it replaces, the plastic die weighs 1,500 pounds instead of 6,000. It took less than three weeks to build, whereas the usual high-alloy steel die requires about 15 weeks.

Made of a thermosetting liquid phenolic plastic, the die was formed from a plastic mold. Cold liquid plastic was poured into the mold and allowed to set. Then it was coated with a thickness of wax equal to the thickness of the metal to be stamped, and a mating die was made from the coated original.

Science News Letter, October 25, 1952

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Questions

ANIMAL HUSBANDRY — How can calves be made to produce good meat on scanty diet? p. 258.

• • •

ARCHAEOLOGY—What new method has been developed for dating archaeological finds? p. 265.

• • •

ENGINEERING — Why are heat pumps not practical for home heating now? p. 258.

• • •

MEDICINE—Why can't you take a pill for polio protection at present? p. 259.

• • •

PHYSICS—How good a memory has barium titanate? p. 264.

How is the shortage of selenium being relieved? p. 261.

What data have been obtained at 40 miles above the top of the world? p. 263.

What speed is reached by particles in the new 60-inch cyclotron? p. 264.

• • •

Photographs: Cover, Argonne National Laboratory; p. 258, Dravo Corporation; p. 259, U. S. Army; p. 263, U. S. Navy; p. 272, Bakelite Company.

TECHNOLOGY

Bolivian Tin Smelter

➤ AMERICA'S TIN refinery in Texas, a war-time project sponsored by the federal government, may find itself without ore to handle in the relatively near future.

Built to refine concentrates from Bolivian mines, the refinery now faces a loss of its raw materials with a recent decision of Bolivia to construct a refinery in that country.

If there are any important tin deposits in the United States, they are well hidden and so far have escaped detection. A few tons a year are all that are produced in the United States, while 100 tons a year are produced in Alaska. This country, which consumes about one-half the tin mined in the world, needs approximately 70,000 tons of new tin annually.

Bolivia has the only large deposits of tin yet discovered in the western hemisphere. Principal tin producers of the world are Malaya and other Far East countries. The Belgian Congo and Nigeria, Africa, produce much lesser amounts.

Shipping lanes from these distant countries, however, could be easily cut by an active enemy in another world war, if one should come, and the United States would be forced to rely largely on Bolivia for a metal that plays a big part in any defense program.

In September, 1952, Bolivia took two notable and unprecedented steps relative to its tin industry, a bulletin from the Malayan Tin Bureau states. These steps, it says, are the Bolivian government announcement that it has decided to nationalize the country's three major tin-mining companies, and that it has signed an agreement with an Argentine financial group for the construction of a smelter in Bolivia to produce 99.9% tin metal.

In nationalizing the mines, the government is hoping for a solution to the many political, social, economic and physical difficulties now faced by the Bolivian tin-mining industry.

The ore is found high in the Andes at altitudes where work is difficult. Again, the ore is in irregular veins and is recovered only by underground mining. The ores are complex and present difficult problems in reduction. Transportation is difficult and costly because of the mountainous terrain and the lack of railways or highways.

Science News Letter, October 25, 1952

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DENTISTRY

Straightening Teeth Diet

➤ SPECIAL RULES on diet and toothbrushing for the child or grown-up who is wearing appliances to have his teeth straightened have been set forth by Dr. Sidney I. Kohn of Jersey City, N. J.

Absolutely no sweets or starches should be eaten during the first two weeks after the appliances are put in. The no-sweets rule applies during the second two weeks also, though some starches may be allowed then.

The reason for this rule, Dr. Kohn explained, is that bacteria that act upon carbohydrates—sugars and starches—to form tooth-destroying acid show a marked increase after insertion of appliances. When sugars and starches are omitted from the diet, there is a rapid reduction in the number of these bacteria.

Cakes, pies, pastries, cooked cereals, white bread, preserved fruit, flavored drinks, ice cream, creamed foods and candies should be avoided, particularly during the first two weeks the appliances are in the mouth, Dr. Kohn said.

Detergent foods—such as fresh fruits and vegetables—should be eaten at the end of meals by persons wearing appliances because these foods help remove the carbohydrates in food debris that can accumulate around appliances.

The teeth should be brushed regularly and carefully after meals to remove the remaining food debris around appliances. These present difficulties in tooth brushing. Neither the type of brushing nor the type of brush usually recommended is satisfactory. Patients wearing appliances should be taught to use the tufts at the end of the brush to clean bands, wires, attachments and enamel.

Dr. Kohn recommended that toothbrushes with bristles of equal length should be trimmed so that the bristles create a plane, inclining from the end of the brush toward the handle. The bristles nearest the handle are shortest, about half their original height, while those at the extreme end retain their original length. This type of brush permits the patient to use the end tufts for cleaning the teeth and appliances, and the full length for supporting structures of the teeth.

Science News Letter, October 25, 1952

BIOCHEMISTRY

Two Pituitary Hormones Separated for First Time

➤ TWO HORMONES from the pituitary gland, oxytocin and vasopressin, have been isolated in highly pure form and, for the first time, separated from each other, Dr. Vincent du Vigneaud of Cornell University, New York, announced at the symposium on the occasion of the opening of the biochemistry and virus laboratory of the Uni-

versity of California in Berkeley, Calif.

Oxytocin causes contraction of the uterus and is used to bring on labor in difficult childbirth cases. Vasopressin raises the blood pressure and cuts down kidney secretion. This double function of the hormone had been suspected, but Dr. du Vigneaud's research gives the first conclusive evidence for this. It is the only remedy doctors have for combating diabetes insipidus.

Although these two hormones had previously been partially separated by Dr. Oliver Kamm of Parke-Davis and Co., Detroit, the separation had not been complete and some scientists thought vasopressin was an essential part of oxytocin.

Both hormones, Dr. du Vigneaud reported, are polypeptides made of amino groups with apparently eight amino groups in each. Six of these are identical in both.

Ultimate aim of the research by Dr. du Vigneaud and his colleague, Dr. John G. Pierce, is to synthesize the two hormones.

Science News Letter, October 25, 1952

SURGERY

New Noses From Steers

Cartilage cut from the end of a steer's breastbone has been used successfully in 144 operations during the last four years.

➤ NEW NOSES, chins, foreheads or other human features can be made from the breastbone cartilage of young steers. The xiphisternal cartilage for this purpose is prepared by Armour Laboratories in Chicago, according to a method developed by Sir Harold K. Gillies, British plastic surgeon.

The breastbone cartilage has been used by Sir Harold in 144 operations during the last four years and also by American surgeons. It is equal, they report, to any human or synthetic implants now in use.

The cartilage is removed from the end of the steer's breastbone immediately after the animal is slaughtered. It is dropped into a sterile solution and next is carefully stripped of all adherent tissues. It emerges from this process as a soft, rubbery, white half-moon about four by two inches in area and up to a third of an inch thick. After further special treatment, it is packed in a sterile solution in a glass jar ready for use.

The surgeon cuts off as much as he needs to mend a damaged nose or other feature, carves the piece to fit, and leaves the rest of the cartilage for the next operation.

The material does not set up foreign body reactions in the host, takes well, resists absorption and does not curl or warp. Another advantage of the material is its relatively low cost, achieved through elimination of preliminary surgery on the patient or donor to get material for grafting, and also of the hospital cartilage bank for keeping such material from humans.

Science News Letter, October 25, 1952

PHYSICS

Nature Outdoes Bomb

➤ THE ENERGY in a thunderstorm is equal to 50 Hiroshima-type A-bombs.

The work done against the atmosphere by an average thunderstorm cell has been measured for the first time by Dr. Roscoe R. Braham, meteorologist with the University of Chicago. He finds that one thunderstorm cell does work equal to 260,000,000,000,000 calories. There are about four to six cells in one thunderstorm. The Hiroshima A-bomb released energy equal to about 20,000,000,000,000 calories.

Nevertheless, Dr. Braham finds, the thunderstorm is a rather inefficient way of making rain. Only about 10% of all the moisture a thunderstorm gathers in from the surrounding atmosphere usually falls to the ground as rain. About half the total moisture never leaves the vapor stage to become water. About 20% which becomes water is re-evaporated in the down-draft of the storm. About 20% is dissipated when the storm breaks up. That leaves only 10% to become rain.

The tremendous amount of energy of the thunderstorm is used to accumulate all this moisture from the atmosphere and to carry it up in an up-draft inside the storm. Fifty A-bombs could not do the same thing, if touched off together, because their energy is dissipated so suddenly. The storm's energy is dissipated over a period of several hours, thus it has a chance to go to work on the atmosphere.

Dr. Braham's calculations of the energy of a thunderstorm were based on work done under the Thunderstorm Research Project sponsored by the University of Chicago and the U. S. Weather Bureau. They are reported in the *Journal of Meteorology* (Aug.).

Science News Letter, October 25, 1952

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Do You Know?

Deaths from *tuberculosis* cut off an estimated 1,500,000 potential years of life annually.

An ordinary wrist *watch* ticks about 157,680,000 times a year.

A new sugar-free *ginger ale* is sweetened with a synthetic that is non-fattening.

Except for a close relative in western Mexico, the Gila monster is the only poisonous *lizard* in the world.

Dry cells can be carried loose in a car's glove compartment or in metal tool boxes without being short-circuited if their positive poles are coated with fingernail polish.

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SOIL-SOAKING HOSE looks like an old garden hose that is riddled full of tiny pin-sized holes. When in operation, water squirts from the holes and soaks the lawn evenly, allowing proper seepage into the ground. Made of vinyl resin tubing, the sprinkler has no moving parts and attaches to a standard garden hose.

Science News Letter, October 25, 1952

CAR VACUUM CLEANER for automobiles attaches to the windshield-wiper vacuum line and picks up dust, dirt, sand, pebbles and lint from the floors or upholstery. Complete with 12 feet of rubber hose, the unit has a removable dust bag and an all-plastic case.

Science News Letter, October 25, 1952

HACK SAW-DRILL combination hand tool operates on standard 110-120 volt electricity, and is converted from a saw to a drill at the flip of a switch after the proper tool has been inserted in the chuck. Accessories include drills in sizes up to ¼-inch, and various wood and metal files.

Science News Letter, October 25, 1952

NEW CHECKS have a built-in "burglar alarm" that operates when a "check artist" tries to change the payee's name or the amount of the check. Ink eradicator and forger's acids make visible hundreds of tiny "voids" printed invisibly in the check paper to warn persons when the check has been tampered with.

Science News Letter, October 25, 1952

WATER FILTER converts ordinary tap water into chemically pure, soft water satisfactory for automobile batteries, electric irons and other devices needing demineralized water. Fitting into the neck of a squeezable, polyethylene plastic bottle, as shown in the photograph, the filter changes color when exhausted and can be replaced easily.

Science News Letter, October 25, 1952

KNIFE AND HAND-AXE set for outdoorsmen features long-lasting cutlery steel blades fitted into rugged, knurled butyrate plastic handles. Leather sheaths for the knife and axe loop together so the instruments can be carried on a belt as a unit, or so that either can be carried separately.

Science News Letter, October 25, 1952

SYNTHETIC RUBBER has been manufactured using fluorine as an ingredient to provide extreme resistance to oil and air attacks that deteriorate ordinary rubbers. The compound resists lubricants and hydraulic fluids of automobiles, ships and, particularly, of aircraft. It also shows "good stability" when hot.

Science News Letter, October 25, 1952

SNAPSHOT DATER attaches easily inside of ordinary roll-film cameras, or any other kind, and prints the date on the upper left hand corner when the negative is exposed. The dater can be obtained to print the month and year or the season and year on the film. Location of the dateline permits easy cropping for special enlargements.

Science News Letter, October 25, 1952

Nature Ramblings

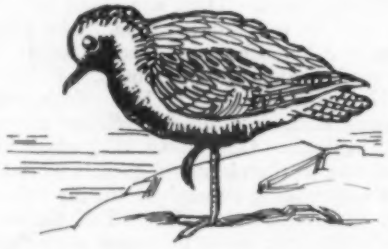
AMONG THE many things that man has in common with the animals is a tendency to stay put. In some primitive human societies, tribes of nomads and hunters have been known to follow the seasons in limited migrations. Some animals make similar adjustments to seasonal changes.

But the great migrations over long distances are made by birds and fishes. Both perform prodigious feats of navigation and endurance, but the more spectacular, possibly because the evidence is more readily apparent, are the seasonal comings and goings of the birds.

The distances that birds go to find a climate that suits their tastes are simply staggering. Petrels, a kind of sea bird, nest on islands in the Antarctic region. For the winter, they fly to North America.

Golden plovers raise their young on the shores of the Arctic Ocean. Before the long winter freeze sets in, they take wing for the Argentine pampas. They do not cover this tremendous distance, as you might expect, in a straight line "as the crow flies."

Bird Migrations



The first leg of their journey is easterly, following the northern coastline of the continent. Not till Labrador do they start heading south. But once pointed in the direction of their winter home, they stay on course even though this means flying over the open sea for 2,400 miles.

Another great traveler, probably the greatest of all, is the Arctic tern. He travels from the Arctic to the Antarctic, covering more than 20,000 miles on the round trip.

The ducks, at which thousands of Americans are blasting away from damp and chilly duck-blinds all over the country, are here for the winter from their nesting grounds in northern Canada.

What guides the birds on their lengthy migrations remains a mystery. The usual answer is "instinct," but that merely describes the phenomenon without explaining it. There are many arguments to disprove the theory that they follow familiar landmarks. The most convincing is the fact that the last birds to leave are the young birds born that year. The older birds who have made the flight before are gone. And yet the youngsters follow the traditional flyway unerringly.

Recently the explanation has been suggested that the birds are guided by the magnetic field of the earth. This theory has been neither proved or disproved. It would carry more conviction if all birds flew in direct north and south lines. On the contrary, each kind of bird has its own characteristic flight path.

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